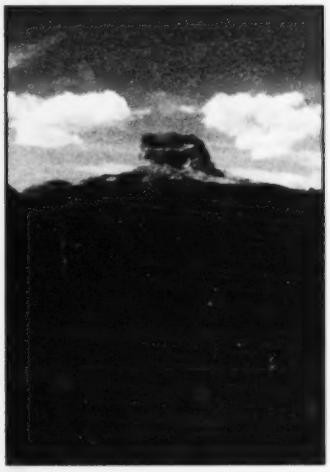
# Maintenance and Recovery Plan for Western Blue Flag *(Iris missouriensis)* in Canada



**Alberta Species at Risk Recovery Plan No. 1**

Alberta
SUSTAINABLE RESOURCE DEVELOPMENT

103-01854/

# Maintenance and Recovery Plan for Western Blue Flag *(Iris missouriensis)* in Canada

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## PREFACE

Albertans are fortunate to share their province with a diverse variety of wild species. Populations of most species of plants and animals are healthy and secure. However, a small number of species are either naturally rare or are now imperilled because of human activities. We place a high value on these "species at risk" and need to work cooperatively with industry, conservation groups, landowners and other stakeholders to ensure these species and populations are restored or maintained for future generations.

One of the important components of Alberta's species at risk conservation program is the development and implementation of recovery plans for some species at risk. Our commitment to the Accord for the Protection of Species at Risk in Canada, to the National Framework for the Conservation of Species at Risk, and to the requirements established under Alberta's Wildlife Act, means that recovery plans will be completed for Alberta species that are designated as threatened or endangered. The overall goal of the recovery program is to restore species identified as threatened or endangered to viable, naturally self-sustaining populations within Alberta.

Alberta Species at Risk Recovery Plans are prepared under the supervision of the Alberta Fish and Wildlife Division. These recovery plans are prepared by Recovery Teams composed of a variety of stakeholders. Membership is by invitation from the Director of Wildlife Management in the Department of Sustainable Resource Development and includes representation from the diversity of interests unique to each species and circumstance. Preparation of these recovery plans will include an opportunity for other interested parties and individuals to comment on the plans for species recovery. Conservation and management of these species continues during preparation of the recovery plan.

Recovery plans are a comprehensive compilation of goals, objectives, strategies and actions, both short- and long-term, required for recovery of the particular threatened or endangered species. Completion of recovery plans includes a review and recommendation to the Minister from the Alberta Endangered Species Conservation Committee. Plans accepted and approved for implementation by the Minister are published as part of this report series. Approved plans are a summary of the Department's commitment to coordinate and implement conservation actions necessary to restore and/or maintain these species.

Recovery plans are "living" documents and are revised as conditions change or circumstances warrant. Each approved plan includes a process for plan review and for monitoring the results of implementation. Implementation will be subject to the identification of sufficient resources, both inside and outside government, to do the job that is required, while respecting overall program priorities of the Alberta Government.

## EXECUTIVE SUMMARY

In the fall of 2001 the Alberta Minister of Sustainable Resource Development delegated the task of preparation of a Western Blue Flag Recovery Plan to a team comprised of resource managers and public stakeholders. The need for the plan had been established by a decision at that time to list the species as Threatened in Alberta's Wildlife Regulations. A team was assembled in September 2001 comprised of 5 Cardston area ranchers, 5 representatives of stakeholders groups (Alberta Cattle Commission, Alberta Conservation Association, Alberta Native Plant Council, Lethbridge Naturalists Society, and Society for Range Management) and two government departments (Alberta Fish and Wildlife Division, Alberta Parks and Protected Areas). The team members were selected to represent a broad range of interests in both conservation of the species and the potential implications of management on landowners.

The team refers to itself as the Western Blue Flag Maintenance/Recovery Team, and has named the plan a Maintenance and Recovery Plan because of the management objective of maintaining the current range and population of western blue flag as opposed to a designated increase or recovery. In this respect the plan may differ from other species recovery plans for which the management objective may be to recover from unnaturally low levels.

The Western Blue Flag Maintenance and Recovery Plan is made up of two sections. The Maintenance/Recovery Strategy outlines principles, goals, and objectives, plus describes current status, limiting factors, and general recommendations for management. The Action Plan identifies specific tasks and provides a schedule of when the activities will be done and by whom.

The primary goal of this plan is to ensure long-term maintenance of the naturally occurring population of western blue flag in Canada. It does not apply to introduced populations of the species. The plan is designed to reflect the principles of co-operation and voluntary participation, stakeholder involvement in management decisions, protection of a Threatened species in a sustainable ranching landscape, and landscape management to benefit not just western blue flag but multiple species of native grasslands.

The plan includes an update of population size and descriptions of the 11 sites where the species is known to occur. It includes a schedule for continued inventory and monitoring. Management recommendations are provided which address the needs of the species in a manner considered practical for the landowners that provide habitat for the Canadian population. Recommendations for Alberta's Wildlife Regulation pertaining to Western Blue Flag are included, as well as an update suitable to allow a review of management status. Information is provided on individual range management plans and ranch improvements available to co-operating landowners. Important research needs are identified.

The Western Blue Flag Maintenance and Recovery Plan will be subject to an annual review by the team. The plan has a designated life of five years, after which it will be reviewed and revised by the Maintenance/Recovery Team.

## ACKNOWLEDGEMENTS

The strong commitment of the Western Blue Flag Maintenance/Recovery Team made this plan possible. Richard Quinlan led the team and acted as scribe for the report. Linda Cerney performed the demanding and time – consuming role of team secretary. Each member of the team contributed valuable discussion and insight into what is needed for management of western blue flag. Team members spent many valuable hours of their own time to ensure the plan would be effective and practical. Team membership included the following individuals:

- Jeff Bectell; Rancher; Carway.
- Paul Blogorodow; Alberta Provincial Parks and Protected Areas; Lethbridge.
- Linda Cerney; Alberta Conservation Association; Lethbridge.
- Terry Clayton; Alberta Native Plant Council; Lethbridge.
- Marvin Conrad; Alberta Cattle Commission; Warner.
- Shawn Cook; Rancher; Carway.
- Reg Ernst; Society for Range Management; Lethbridge.
- Blair Hendry; Rancher; Carway.
- Raymond Hodgdon; Rancher; Whiskey Gap.
- Brad Nay; Rancher; Whiskey Gap.
- Richard Quinlan; Alberta Fish and Wildlife Division; Lethbridge.
- Bill Sharp; Lethbridge Naturalists Society; Lethbridge.

Many other people contributed to the successful operation of the team and development of the plan. Steve Brechtel, the Provincial Species at Risk Biologist, provided the team leader with valuable initial and ongoing advice on team development, priorities, and the recovery planning process in general. Reg Ernst updated the inventory of western blue flag, compiled historic information, and developed the draft species status review for this report. Robin Gutsell assisted with the team approval process, provided liaison with the Endangered Species Conservation Committee, and assisted with editing. Terry Kosinki and Sue Cotterill also provided comments on earlier drafts. Pat Dunford is assisting through preparation of the Wildlife Regulation pertaining to western blue flag. Richard Rowell of the Nature Conservatory of Canada provided a valuable presentation to the team on Conservation Easements. Cliff Wallis and Cheryl Bradley provided pertinent information on historic records of the species. Sherry Feser provided electronic copies of figures to be used in the report. Cheryl Trapp assisted with arranging facilities. Brad Taylor and Brad Downey assisted with report formatting.

Alberta Fish and Wildlife Division provided funding for team expenses. In-kind contributions of Alberta Conservation Association and Alberta Parks and Protected Areas are much appreciated.

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# 1. MAINTENANCE/RECOVERY PLAN FOR WESTERN BLUE FLAG *(Iris missouriensis)*

## 1.1. Introduction

In September 2001 Alberta's Minister of Sustainable Resource Development approved western blue flag *(Iris missouriensis)* for listing as a Threatened species in the Alberta Wildlife Act. Prior to that, in May 2000, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) reviewed the status of western blue flag in Canada and upheld it's 1990 classification of Threatened. Both these actions stimulated the initiation of the recovery process for western blue flag.

## 1.2 Responsibility for Production of the Maintenance/Recovery Plan

Alberta's Wildlife Act designates that Recovery Plans are to be prepared by the Minister, with a review of each plan to be carried out by the Alberta Endangered Species Conservation Committee. The preparation of this plan has been formally delegated from the Minister to a Recovery Team, involving people with an interest in, or who may be affected by the Recovery Plan.

The National Framework for the Conservation of Species at Risk identifies that it is the responsibility of the range jurisdiction to develop a national Recovery Plan. The Recovery Plan is to be comprised of a Recovery Strategy and Action Plan, both of which are contained in this document. The total Canadian range of western blue flag is in Alberta, and therefore Alberta is the range jurisdiction and has this responsibility.

This plan is designed to satisfy the criteria for provincial and national Recovery Plans. It will be designated as both a provincial and national Recovery Plan.

## 1.3 Plan Format

In order to be consistent with the format criteria of the national recovery process this plan has two primary components, the Maintenance/Recovery Strategy and the Action Plan. The Maintenance/Recovery Strategy outlines goals and objectives, describes the current situation for the species, and recommends management and research needs. The Action Plan identifies where and when specific management actions will be implemented.

## 1.4 Life of Plan

The Maintenance/Recovery Strategy will have a five-year approval term. The Action Plan also addresses a five-year period, but will be subject to an annual review and update by the Maintenance/Recovery Team. A review at year five may renew the Strategy and Action Plan for another five years, amend it, or may result in a total rewrite of the plan.

## 2. MAINTENANCE/RECOVERY STRATEGY

### 2.1 Common Principles

The planning team agreed to a common set of principles upon which the Maintenance and Recovery Plan is based. These principles include:

- The Maintenance and Recovery Plan will reflect the principles of co-operation and voluntary participation.
- Stakeholders will participate in management decisions for western blue flag.
- Flexible management will provide long-term sustainability for the species, but recognise that with the widely varying climatic conditions in southwestern Alberta, reasonable opportunity needs to be provided for deviation from the Maintenance and Recovery Plan, without landowners being subject to penalty.
- The Maintenance and Recovery Plan will provide for protection of a threatened species in a sustainable ranching landscape
- The Maintenance and Recovery Plan will encourage landscape management which benefits not just western blue flag, but multiple species of the native grassland community.

### 2.2 Goal

The goal of the western blue flag maintenance and recovery program is:

- To develop, communicate and encourage management to ensure long-term maintenance of the naturally occurring population of western blue flag in Canada.

### 2.3 Objectives

There are several specific objectives of the western blue flag recovery program:

1. To identify and initiate appropriate management activities for western blue flag.
2. To implement an ongoing inventory and monitoring program for western blue flag.
3. To identify approximate minimum and maximum population objectives as +/- 20% of current stem numbers for each naturally–occurring western blue flag site.
4. To recommend effective criteria for regulations that protect western blue flag and respect private landowners rights.
5. To provide information to the Alberta Endangered Species Conservation Committee to allow for an update of species management status.
6. To develop, communicate and encourage general principles for grazing management of western blue flag habitat.

7. To identify, and act upon, any government policy changes that may be necessary for long–term sustainability of western blue flag.
8. To develop a range/habitat plan for each landowner with western blue flag sites and encourage implementation of specific recommendations to maintain western blue flag.
9. To assist landowners through provision of various improvements that enable them to manage their land in a manner which sustains western blue flag.
10. To provide education on management of this species and other species at risk.

### 2.4 Western Blue Flag Biology

Western blue flag plants are generally 30 – 60 cm tall, with pale blue – green leaves 10 – 40 cm long and 5 – 10 mm wide. The leaves grow from the base of the plant and are folded in half length-wise. The flowering stems are leafless or may have one leaf. Flowers usually occur two to four to a stem, and are irregular and blue – violet in colour. The seed capsule is 2 – 5 cm long and oblong. The western blue flag is a perennial species that reproduces from seed and underground rootstocks (Wallis 1989). Flowering generally occurs in Alberta from mid-June to mid-July. Western blue flag requires wet soil in spring and drier conditions in the following months (Ernst 2000).

A more thorough description with diagrams and photographs can be found in the "Alberta's Threatened Wildlife" Western Blue Flag Brochure (Alberta Environmental Protection 1998) or on the Alberta Species at Risk web page: www3.gov.ab.ca/srd/fw/riskspecies/index.html.

### 2.5 Population Distribution

Western blue flag is a widespread species in western United States (Figure 1). In Canada, western blue flag is restricted to a small area of south-western Alberta extending from the western portion of the Milk River Ridge west to Police Outpost Provincial Park (Figure 2). All known native sites are situated in an area within 10 km of the Canada/United States border extending about 30 km east to west. There are some additional domestic and introduced sites in Alberta and Canada. This plan does not apply to these non-native plants.

FIGURE 1. NORTH AMERICAN DISTRIBUTION OF WESTERN BLUE FLAG (FROM GOULD 1999)

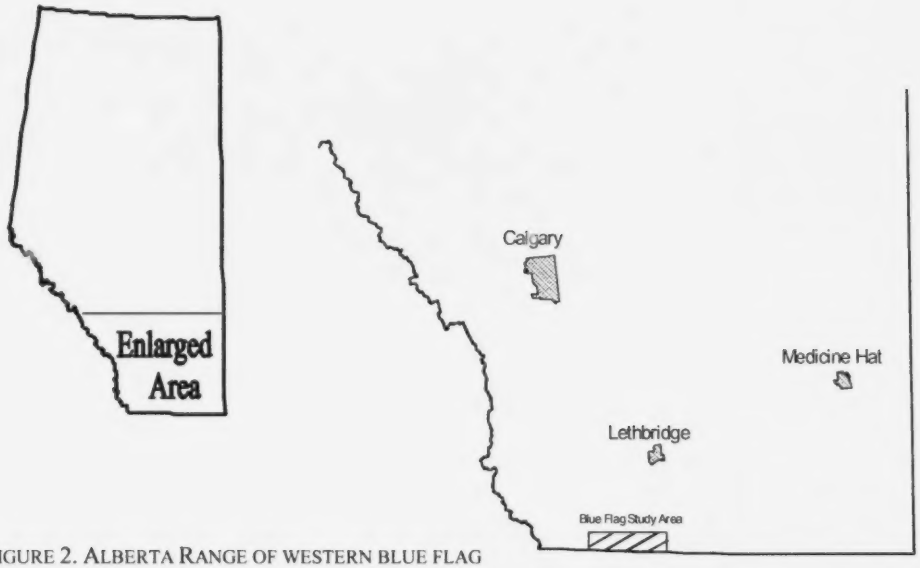


FIGURE 2. ALBERTA RANGE OF WESTERN BLUE FLAG

## 2.6 Population Status

The Alberta status report for western blue flag (Gould 1999) lists six sites with naturally occurring western blue flag, but searches carried out in 2000 confirmed only four of the six (Ernst 2000). A further review of the original information has determined that one of the "new" 2000 sites of western blue flag is, in fact, one of the original sites from 1989. Therefore, upon reassessment, five of the original six sites have been confirmed, while plants at a site named "Mary Lake" were not found in 2000. The 2000 and 2001 inventories resulted in six new sites being discovered. Therefore, at the time of preparation of this plan (winter 2001-2002), a total of eleven natural sites are known to occur in Alberta and Canada. To maintain the capability to manage these sites effectively, while also protecting landowners desires for confidentiality, exact locations of western blue flag are not included in the plan. Numbers at five of the sites are relatively large (2091, and 6049 stems, plus cumulative total of 4996 stems at the three Boundary sites). The other six sites support smaller numbers (171, 177, 200, 203, 300 and 570 stems), The 2001 Canadian population estimate is 14,757 stems (Table 1).

Given the likelihood of some additional occurrences in the area, it is impossible to determine if any of these sites constitute a distinct population (i.e.: no cross-fertilisation with other sites). For this reason the term "population" is not used for any of the site occurrences. Individual sites have been designated based upon their distance from other occurrences (greater than 100 metres).

TABLE 1: A COMPARISON OF WESTERN BLUE FLAG STEM COUNT AND FLOWERING STALKS FOR THE YEARS 1989, 1998, 2000 AND 2001.

| Site | Date | Total Stems | Flowering Stalks |
|---|---|---|---|
| POPP west | 1989 | 650 | 6 |
| | 1998 | 325 | 1 |
| | 2000 | 219 | 14 |
| | 2001 | 203 | 8 |
| POPP east | 1989 | N/A | N/A |
| | 1998 | N/A | N/A |
| | 2000 | 175 | 14 |
| | 2001 | 177 | 26 |
| Harrisville* | 1989 | 1500 | several hundred |
| | 1998 | N/A | N/A |
| | 2000 | 2091 | 304 (mostly pods) |
| Carway North a | 1989 | 5000 | high proportion |
| | 1998 | N/A | N/A |
| | 2000 | 6049 | 256 |
| Carway North b | 2001 | 300 (est.) | 30 (est.) |
| Carway South | 1989 | N/A | 25-30 |
| | 2000 | 570 | 42 |
| Carway East | 2001 | 200 (est.) | N/A |
| Whiskey Gap | 1989 | 203 | 0 |
| | 1998 | 111 | 2 |
| | 2000 | 171 | 2 |
| Boundary (3 Sites) | 2001 | 4996 | 547 |
| 1989 western blue flag population estimate = 7500 stems<br>2000 western blue flag population estimate = 9275 stems<br>2001 western blue flag population estimate = 14757 stems | | | |

* Formally known as Beazer Site

### 2.7 Population Trends

In 1989 the population of western blue flag was estimated as 7500 stems (Wallis and Bradley 1989). That figure was based on inventories of six sites. Eleven sites have now been confirmed with a total population estimate approximately double that from 1989 (Ernst 2002). This is not an indication of trend, but rather a result of there being more known sites. A comparison of four original sites from 1989 to 2001 can be made from Table 1. The Police Outpost Provincial Park West site has decreased from 650 to 203 stems in 12 years, the Whiskey Gap site has dropped from 203 to 171; while the Harrisville, and Carway North sites have both experienced increases (Harrisville 1500 to 2091, Carway North 5000 to 6049). The cumulative trend for the four sites shows a population increase from 7353 to 8514.

## 2.8 Western Blue Flag Habitat

In Alberta, western blue flag occurs in small portions of the Foothills Fescue Grasslands and Foothills Parkland Natural Subregions. A detailed description of climate, soils, elevation and vegetation is included in the Alberta status report (Gould 1999). As a general rule, western blue flag is associated with areas of high soil moisture in the spring and dry conditions later in the summer (Ernst 2000). Clumps of western blue flag often occur in the transition zone between riparian and upland areas, but in some cases are located in small depressions in relatively dry upland communities which experience early season moisture due to snow melt or subsurface flow. With the exception of the Police Outpost Provincial Park sites (which are located near Police Outpost Lake) there is no visible surface water at blue flag sites (Ernst 2000).

## 2.9 Population Threats and Limiting Factors

There are several potential threats to western blue flag in Alberta. They may be roughly categorised as habitat loss, habitat degradation, alteration of hydrology, competition from invasive species, and direct killing of plants. An evaluation of the significance of each is included below.

### *2.9.1 Habitat Loss*

Direct habitat losses relevant to western blue flag management include cultivation and conversion to tame pasture. Although it may seem unlikely that the species was abundant at any time in Alberta, it is probable that some sites have been lost over the past 100+ years due to cultivation and conversion to tame pasture.

### *2.9.2 Habitat Degradation*

Grazing by native ungulates and fire were important processes in the native grassland ecosystem, which have been disrupted through the removal of bison from the range, and control of wildfire. Cattle may be considered a tool for simulating the natural processes, and therefore domestic grazing has become an important factor in the maintenance of native grasslands. The exclusion of grazing in Police Outpost Provincial Park appears to have resulted in excessive litter build-up and competition from other species, which may be contributing to the decline in numbers of stems (Ernst 2000).

Western blue flag habitat degradation may also occur through overgrazing and trampling. However, the existing information on this is inconclusive, and additional research is recommended. These impacts are likely exacerbated during periods of prolonged drought such as has been occurring in 2000 and 2001. In some cases the situation is local, such as around a livestock watering facility, while in other cases it may affect larger areas due to range management practices.

### *2.9.3 Alteration of hydrology*

Two natural conditions, drought and flood, may affect local sites of western blue flag. It is speculated that the decrease in numbers at the Whiskey Gap site (a

relatively dry upland location) may be partially due to the prolonged drought of 2000-2001. Conversely, the decrease in the Police Outpost West site may be related to periods of increased lake levels resulting in saturated soil through most of the growing season (Cornish 1998). The development of stock watering facilities and drainage projects may, in some cases, result in alteration of water tables to the detriment of nearby western blue flag plants. If, in fact, these facilities are developed to reduce grazing pressure and trampling on the plants, then a site-specific evaluation and monitoring is needed to determine specific benefits and risks.

*2.9.4 Competition from Invasive Species*

Competition from non-native plant species is a potential threat for all western blue flag sites. It is an immediate concern at the Police Outpost east and west sites, where smooth brome *(Bromus intermis)* has become the dominant vegetation (Cornish 1998, Ernst 2000, Ernst 2002). Kentucky bluegrass, timothy, and other invader species are present at several sites.

*2.9.5 Direct Killing of Plants*

Direct killing may result from physical removal of the plants or application of herbicides directly or indirectly. There is no evidence that intentional killing of western blue flag clumps has been occurring.

**2.10 Population Inventory and Monitoring Requirements**

Periodic censuses need to be done of known western blue flag sites. If downward trends are noted at a site through this monitoring, frequency of the counts may need to be increased.

As the co-operative and voluntary nature of this Maintenance and Recovery Plan becomes known, it is hoped that additional landowners will notify a member of the Maintenance/Recovery Team (see Acknowledgements for list of names) or Alberta Fish and Wildlife Division of western blue flag on their land. This will provide the opportunity to inventory these new sites. Knowledge of as many western blue flag locations as possible will help to determine the true status of this species.

An additional incentive for reporting new sites, is the opportunity that exists for a limited time through the Western Blue Flag Conservation Program (Alberta Conservation Association). This program funds a full–ranch range inventory and management plan for landowners with western blue flag.

In 2001-2002 participating western blue flag landowners have also received funding assistance for fencing and water improvements which have benefited their operation and improved management of western blue flag.

It is expected that additional sites of western blue flag may be revealed as it becomes generally understood in the Cardston area that the western blue flag maintenance and recovery program poses no threat to landowners rights or privileges, and provides some funding to benefit ranch management. As each

new site is identified, permission to access will be requested from the landowner, and where access is granted, the plants will be inventoried.

**2.11 Site Descriptions**

*2.11.1 Police Outpost Provincial Park (POPP) West*

This is a very small site (about 30 sq. m) with a slight northerly aspect located near Police Lake. In 1995, the lake level rose substantially and may have flooded out some plants. Cornish (1998) noted that previous flooding, a high water table, and competition from smooth brome (*Bromus intermis*) might be reducing the density and vigour of western blue flag at this site. In 2000, an extremely heavy litter build-up and some encroachment from willows were observed at this site. These factors may be having a negative effect on this site.

*2.11.2 POPP East*

This site was first discovered in 2000 (Ernst 2000). It is located about 200m east of the POPP west site on a dry southwest-facing slope. The site is larger and drier than the POPP west site. All the western blue flag plants are located well away from any saturated soil and many are located on drier upland sites. Two clumps are located under willow canopies. Smooth brome is a serious invader on this site, along with bluegrass (*Poa pratensis*) and Timothy (*Phleum pratense*).

*2.11.3 Harrisville*

This is a large site stretching for about 400m on a north-facing slope along an ephemeral drainage. Many of the western blue flag clumps are located on dry upland sites and seem to be very competitive in relatively dense vegetation. Dominant species on this site are non-native grass species including bluegrass, smooth brome, timothy and orchard grass (*Dactylis glomerata)* plus native sedges (*Carex spp.*). In 2000 this site had a high ratio of flowering/fruiting stems. This site was lightly grazed year-round by horses until recently. Cattle now graze it for a few weeks in mid-summer.

*2.11.4 Carway Sites*

The Carway North A site is located about 6 km north of Carway. It has the largest known number of western blue flag stems in Canada (more than 6000). Habitat features at this site show a great deal of variation ranging from bottomlands dominated by sedges and hairgrass (*Deschampsia cespitosa*) to drier upland sites with rough fescue (*Festuca scabrella*). The western blue flag also occurs in the understory of some willow thickets. The site has been grazed in fall and winter for several decades and judging by the large number of stems, this has benefited the plants. Until the late 1980s this area was also regularly grazed in spring. Portions of the Carway North A site have been hayed periodically over the years without any apparent harm to western blue flag.

Another small site (Carway North B), removed from the main site, was newly reported and inventoried during the late fall of 2001.

The Carway South site was described in 1989 as having 25-30 flowering stalks (Wallis 1989). The western blue flag are adjacent to a recently improved dugout.

The site has a high proportion of non-native grasses (cover about 40%). These plants are vulnerable due to the small number of stems in a small area, and the proximity to an important livestock-watering site.

The Carway East site was first reported and inventoried in the late fall of 2001. It is made up of a few widely scattered clumps adjacent to a depression that collects water during the spring. An inventory done during the growing season may reveal additional western blue flag clumps.

*2.11.5 Whiskey Gap*

This is a very small and unique site located on a southwest - facing slope. It is the only known site within the Milk River drainage. Moisture for this site is apparently derived solely from snowmelt and rainfall. The western blue flag occurs along the transition zone between hairgrass and shrubs, with rose (*Rosa sp.)*, shrubby cinquefoil (*Potentilla fruiticosa)*, and wolf willow (*Eleagnus commutata*) present. There are no willows associated with this site.
The western blue flag plants located among the shrubs are of normal size but those located in the grassy meadow are severely stunted (about 10 cm tall). On some plants cattle have nipped off the leaf tips. The plants occur as individuals and occasionally in a group of three or four stems. This is the only site where native grass is the dominant graminoid and where non-native grasses are not a factor. Ample carryover and litter indicate light to moderate grazing; nevertheless, grazing seems to have impacted this site. Perhaps season of use is a factor because this site receives early spring grazing every year.

*2.11.6 Boundary Sites*

Three sites, each separated from the other by 500 metres, are located over an area of roughly 2 sq. km. Several factors make these sites particularly valuable including the large area covered by the plants, the large number of stems (about 5000), and the security provided by an existing conservation easement. Most of the plants are located in the transition zone between wet meadows and drier upland sites. Because this site is spread out over a large area, competing vegetation and conditions are highly variable. Major competing species include native and non-native grasses, sedges, and native forbs. Willow is present in some areas but absent on others. Grazing is light over most of the site.

## 2.12 Management Recommendations

*2.12.1 Grazing:*

Grazing is an important factor in maintaining viable western blue flag sites (Ernst 2000). There has not been any research to determine optimum levels of grazing to conserve western blue flag, but light to moderate grazing (versus no grazing or heavy grazing) should provide the greatest benefit. Under light to moderate grazing, competition is reduced while enough cover is left to protect the soil. This allows the western blue flag to maintain its niche in the plant community.

In a regime with no grazing, litter build-up results in changes to plant community composition. This results in increased competition with western blue flag, and in

some areas, such as Police Outpost Provincial Park, it benefits non-native grasses such as smooth brome, Kentucky bluegrass, and timothy. At sites with no grazing, higher soil moisture retained later in the growing season may also be unfavourable to the western blue flag.

Chronic heavy grazing results in very little cover to protect the soil resource. The soil quickly dries out and erosion and trampling leaves bare patches which develop non-native weeds. Range deterioration results in a change from dominant deep-rooted perennial plants to non-native, unpalatable, weedy species. Under heavy grazing, competition from invading plant species may be unfavourable to western blue flag growth.

Recommendations for grazing must be determined site-specifically as appropriate for local conditions, and no one prescription can be described that will effectively manage the species in all cases.

*2.12.2 Cultivation*:
Uncultivated lands with western blue flag should not be cultivated or broken.

*2.12.3 Haying:*
Haying may be a compatible activity for western blue flag. Sites where haying is occurring should be monitored more frequently to determine long – term effects.

*2.12.4 Herbicides:*
The use of herbicides on western blue flag should be prohibited.

*2.12.5 Water Improvements:*
Drainage projects that result in excessive drying out of western blue flag habitat should be discouraged. However, there are several situations where provision of well–planned and located stock watering facilities may benefit western blue flag through reduction of trampling and grazing of wet areas. Water improvements should be evaluated on a site–specific basis.

**2.13 Research Needs**

In addition to continued monitoring to determine Canadian population trends there should be research carried out on the response of western blue flag to changes in hydrology and grazing. Western blue flag sites subject to haying should also be monitored more frequently to determine whether this management promotes or inhibits stand health. Additional research needs to occur on developing effective methods of restoration of native species in areas heavily invaded by introduced species such as smooth brome. Native sites and apparently introduced sites should be analysed through DNA testing of plants to determine if it is possible to distinguish them definitively.

**2.14 Legislative and Policy Amendments**

There is no federal legislation to protect this species. In Alberta protection is provided by the Wildlife Act. In September of 2001 the Minister of Sustainable

Resource Development agreed to a Threatened designation under the Act. As of early 2002 administrative procedures were underway to amend the Act and Regulations accordingly. Recommendations for a specific wildlife regulation to support the threatened designation need to be provided by the Maintenance/Recovery Team. While Alberta Fish and Wildlife regulations staff will prepare the regulation, it will be done in consultation with the Maintenance/Recovery Team.

### 2.15 Socio-economic Considerations

There is concern amongst landowners in southern Alberta that the presence of a Threatened plant on their property may lead to the imposing of rules, regulations, and programs that limit their capability to make independent decisions regarding management of their own land. As the Western Blue Flag Maintenance and Recovery Plan is the first such plan for a plant in Alberta, and thereby will become somewhat of a template for future plans, it is important to develop and implement protection for the species in a manner that is sensitive to this concern. Out of respect for the landowners' rights, only basic protection for this species will be legislated through the Alberta Wildlife Act and Regulations. The standard approach being promoted through this plan is one of co-operation, voluntary participation by landowners, monitoring of the plant, and ongoing evaluation of the success of management initiatives. The Maintenance/Recovery Team is strongly committed to this approach, and believes it is the most realistic and effective way to manage this "Threatened" species on an agricultural land base.

## 3. ACTION PLAN

### 3.1 Geographic Scope

The geographic area within which active western blue flag management will occur is roughly the extreme south–western portion of the grasslands in Alberta as shown in Figure 2. There is no evidence that naturally– occurring sites exist in other areas of Alberta or Canada. This plan does not recommend introductions of western blue flag to other areas. This Maintenance and Recovery Plan does not apply to non-native (introduced) sites of western blue flag inside or outside the designated geographic area of interest.

### 3.2 Anticipated Conflicts and Challenges

There is an inherent challenge in both developing and gaining acceptance for a recovery/maintenance plan for a "Threatened" species. On the one hand there is the need to protect the species from decline, while on the other hand there is the need to protect private landowners rights and interests. This plan attempts to achieve both, but in doing so it is necessary to take some risks, including the risk that a voluntary co-operative approach may not be respected and followed by landowners. This risk is reasonable in light of the poor effectiveness of dictated and enforced plans in other jurisdictions. There is strong support from the agricultural community for the voluntary co-operative approach and this should result in efforts to manage western blue flag well. A strong monitoring component over the five-year life of the plan will allow an ongoing evaluation of success.

### 3.3 Policy Initiatives

There are no specific changes needed to policies to allow activities in this plan to proceed.

### 3.4 Legal and Management Status Recommendations

*3.4.1 Legal Status:*
The "Threatened" designation under the Alberta Wildlife Act will be supported by a Wildlife Regulation developed in consultation with the Maintenance/Recovery Team, and incorporating the following principles:

- Direct intentional removal or killing of western blue flag should be prohibited.
- Use of herbicides on western blue flag should be prohibited.
- The regulation should apply to naturally-occurring sites of the species, and not apply to sites where the plant has been introduced (e.g.: will not apply in gardens within or outside the current geographic range, or introduced plants outside the current geographic range).
- The regulation should identify the need to allow some active management of individual western blue flag sites, including agricultural activities such as grazing and haying.

- The regulation should recognise that while picking, transplanting, or otherwise removing plants may be prohibited, haying and grazing are compatible activities as identified in the Maintenance and Recovery Plan.
- The regulation should recognise that each known site has lower and upper population goals identified in the Maintenance and Recovery Plan.
- The regulation should recognise that in some situations, such as where a local site is monitored and documented to be exceeding the upper goal, and is encroaching in an undesirable manner onto an adjacent area, removal of stems may be permitted.
- It should also be recognised that the Lethbridge Species at Risk Biologist will be designated as the "regulator" in a local permitting process to evaluate and approve these site–specific removals.

*3.4.2 Status Assessment:*

A review of the current management status using the process applied in 1999 by the Endangered Species Conservation Committee is recommended for fall 2002. The following information is provided to assist in this process.

- In 1999, the ESCC scientific sub-committee recommended the status of western blue flag as Threatened. Their decision was based on the following information: small population size, declining population, small and declining distribution (ESCC 1999). Data used in the status evaluation were obtained from an earlier status report (Wallis and Bradley 1989) and a monitoring assessment done by Cornish (1998). Gould (1999) followed up with a status report in which she listed six natural occurrences of western blue flag in Alberta with a total population of approximately 7500 stems.
- Some of the information used by the ESCC scientific sub-committee to designate western blue flag as Threatened may no longer be valid. Inventories carried out in 2000 and 2001 resulted in new sites being discovered, a higher Canadian population estimate and preliminary trend information on some sites.
- Two small sites inventoried in 2000/2001 showed a decline in stem counts from 1989, but two large sites showed an increase (Table 1). Based on current information, it cannot be assumed that the general population is in decline. Ongoing monitoring is needed to evaluate Canadian population trend.
- The distribution of western blue flag has not changed; it is still limited to about 300 sq. km. in southwestern Alberta. No new sites were found outside the previously known range and therefore, the assumption of limited range is still valid.
- The number of known occurrences has increased from that reviewed by the ESCC scientific sub-committee. While western blue flag was not found at one historic site, six new sites have been discovered. There are now 11 western blue flag sites (A site is considered discrete if it is over 100m. from a neighbouring site).
- The current Canadian population of western blue flag is approximately 14,757 stems. The known population at the time of the ESCC scientific sub-

committee review was just 7790 stems. Population size may no longer qualify as small.

It is important to note that, if numerous additional sites are reported by landowners, a further formal review of the species status should be carried out. This could ultimately lead to a "down-listing" of the western blue flag from "Threatened" to "Species of Special Concern" in a relatively short period of time. If this was to take place within the five-year life of this plan, the document will still be relevant, but be designated as a "Management Plan".

### 3.5 Implementation of Management Recommendations

Grazing should be maintained at western blue flag sites, with the exception of extremely vulnerable sites where excessive trampling may occur. Heavy prolonged grazing should be discouraged due to expected impacts on western blue flag and the range resource in general. Light to moderate grazing (removal of up to 50% of current year's growth) will benefit the species, while also being ecologically sound at the landscape level. Grazing should be carried out at light to moderate intensities during average years. During dry years, heavier grazing may occur but the forage resource should rebound during wet years. Climate change or prolonged dry spells may require adjustments to stocking rates.
At some sites, rest years may be identified at various intervals. There are numerous grazing systems that may be effectively applied, and details of these are included in the specific range management plans being developed for co-operating landowners. The fundamentals of stocking rates, season of use and stock distribution will be addressed in the range management plans, with avoidance of spring grazing being a general recommendation. At sites where grazing does not presently occur (e.g.: Police Outpost Provincial Park), it should be introduced as a closely monitored prescription activity, or simulated through activities such as hand removal of litter and selective mowing.

### 3.6 Range Management Plans

Each landowner that has western blue flag on his/her land is to be offered a range inventory and range management plan through the Western Blue Flag Conservation Program. The program is a co-operative effort between the Alberta Conservation Association Native Prairie Stewardship Program and the Alberta Fish and Wildlife Division Species at Risk Program. The range management plan will include recommendations for management of western blue flag but also include a full–ranch range evaluation with general recommendations for improving range management. The contents of each individual range management plan will be confidential. Implementation of recommendations in the plan will be voluntary.

### 3.7 Voluntary Conservation Actions

Specific improvements that directly benefit western blue flag or allow full–ranch management changes to benefit the species and the grassland landscape in general will be pursued on a voluntary basis. Alberta Conservation Association

and Alberta Fish and Wildlife Division may offer financial assistance for such improvements when funds are available, with specific levels of assistance being determined individually with each landowner. Examples of assistance include provision of fencing and development of well–located stock water facilities.

Landowners may wish to explore mutually beneficial ways to provide long–term security for western blue flag and the native range they depend upon. Conservation easements can be developed with groups such as Nature Conservancy Canada. These agreements ensure appropriate long-term management of the land in the context of a working ranch. Establishing conservation easements is not a requirement for successful western blue flag management, but it has potential for providing long–term security for the species, as well as some welcome financial assistance for landowners with western blue flag.

### 3.8 Monitoring and Evaluation Protocol

Maintenance and Recovery plan monitoring and evaluation will be carried out through the following activities:

- Western blue flag sites will be monitored at five - year intervals, and more frequently where downward trends are noted. On large sites representative clumps of western blue flag will be monitored to determine stem count trends, while smaller sites will have total stem counts completed.
- The Police Outpost Provincial Park and Whiskey Gap sites will be monitored annually for the next five years, due to current downward trends in stem counts.
- A complete census of western blue flag should be carried out every ten years
- A five - year review will be done of all range management plans prepared under the western blue flag conservation program.
- An annual evaluation will be done of the response of western blue flag sites to designated improvement activities.

### 3.9 Research Activities

- Discussion will be initiated with potential partners to evaluate differential grazing effects on western blue flag.
- Universities will be encouraged to provide a graduate student to explore the ecology of western blue flag in Alberta, including an evaluation of soils, and response to various treatments.
- Research will be sought on treatments to reduce intrusion of non-native invasive species in western blue flag habitat.
- Research will be encouraged on DNA analysis of native and introduced populations of western blue flag, to determine if DNA fingerprinting may be used as a tool to distinguish native from plants.

### 3.10 Stewardship, Education, and Public Outreach

The voluntary co-operative nature of this plan is an example of a stewardship approach to natural resources management. The following specific activities will be initiated:

- A public open house will be held in spring 2002 in Cardston to describe the plan to local residents and to provide the opportunity for input and improvements.
- The maintenance and recovery plan will be made available to the public in hard copy and through posting on the Alberta species at risk website.
- Information will be provided to Police Outpost Provincial Park for use in an interpretive program for western blue flag in the park.
- The current information pamphlet on western blue flag will be updated.

### 3.11 Ecological and Technical Feasibility of Management Recommendations

The Maintenance/Recovery Team was designed to include people with a history of practical action. Potentially-affected landowners and stakeholders were included to ensure that the team's recommendations would be practical and effective. Western blue flag is a species that is compatible with working ranches on the landscape, and all recommendations in this plan should be achievable.

### 3.12 Implementation Schedule

Many of the recommendations of the maintenance and recovery plan are already being implemented. An implementation schedule is included in Table 2.

TABLE 2. IMPLEMENTATION OF WESTERN BLUE FLAG MAINTENANCE/RECOVERY PLAN

| ACTIVITY | RESPONSIBILITY | INITIATE | COMPLETE |
|---|---|---|---|
| Plan Approval | AFWD* | 2002 | 2002 |
| Western Blue Flag Inventory | AFWD | 2000/2001 | Every 5 Years |
| Range Management Plans | ACA**/AFWD | 2001 | 2002 |
| Range Improvements | ACA/AFWD/Landowners | 2001 | 2003 |
| Public Outreach | Maintenance/Recovery Team | 2001 | 2002 |
| Park Interpretive Program | APPA*** | 2002 | 2003 |
| Regulations | AFWD | 2002 | 2003 |
| Research | AFWD, ACA, Partners | 2002 | 2005 |
| Monitoring | AFWD | 2005 | Every 5 Years |
| Plan Review | Maintenance/Recovery Team | 2006 | 2007 |

*Alberta Fish and Wildlife Division; ** Alberta Conservation Association;
*** Alberta Parks and Protected Areas.

### 3.13 Five Year Reviews

The life of this plan is 5 years. The Maintenance/Recovery Team will carry out an annual review. The team will be reconvened in 2006 to review the document in more detail and determine whether there are any amendments needed, prior to renewing of the plan for another five years in 2007. The Maintenance/Recovery Team may determine that the plan is suitable, may recommend minor amendments, or may determine it is necessary to carry out a major plan review and rewrite.

## 4. LITERATURE CITED


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